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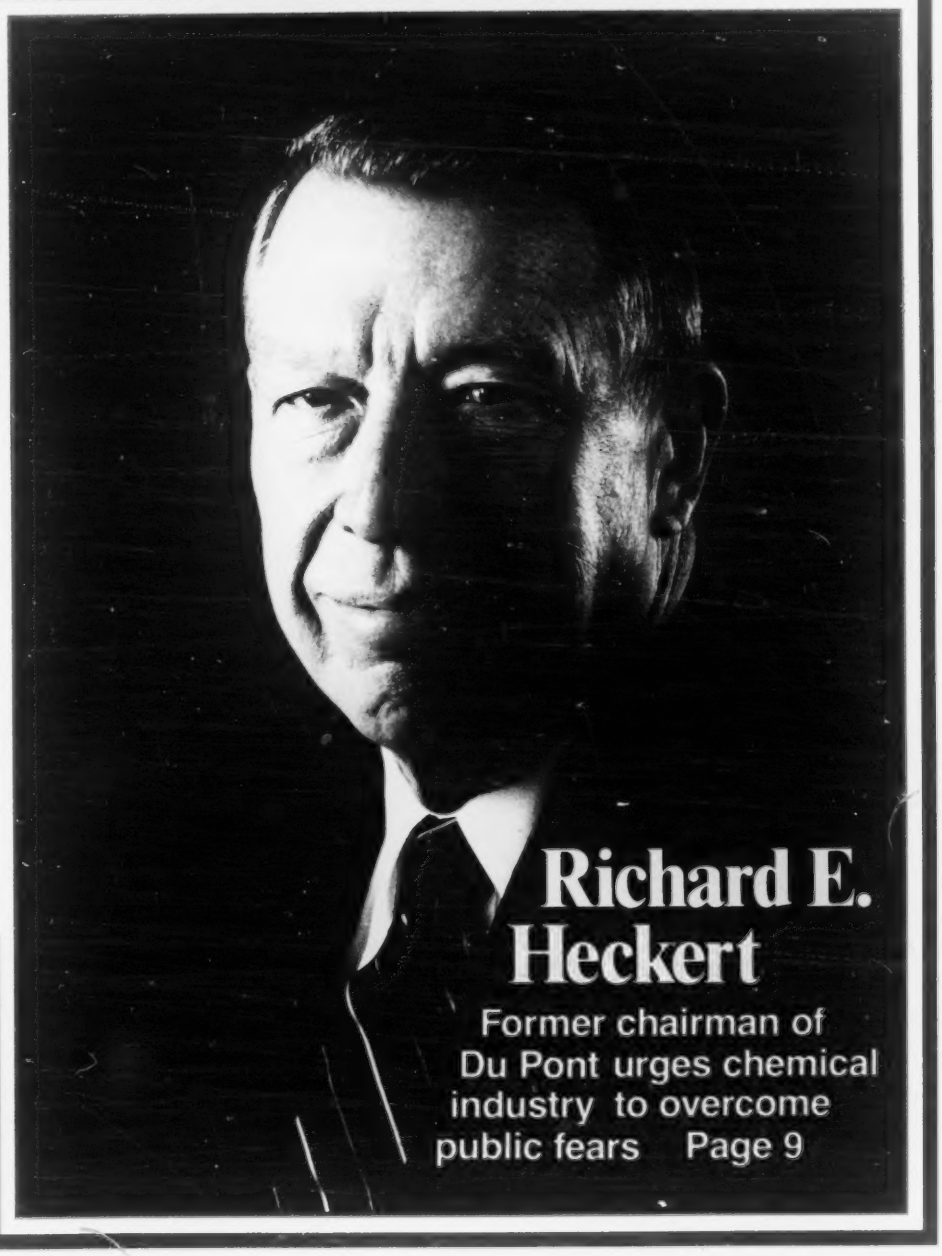
CHEMICAL & ENGINEERING

NEWS



Richard E. Heckert

Former chairman of Du Pont urges chemical industry to overcome public fears Page 9

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CHEMICAL & ENGINEERING NEWS

Volume 67, Number 41
CENEAR 67 (41) 1–48
ISSN 0009-2347

OCTOBER 9, 1989

News of the Week

■ **Three compounds that show promise to replace ozone-depleting chlorofluorocarbons have passed short-term toxicity tests.** **Page 4**

■ **New ammonium perchlorate plant, replacing one destroyed last year by an explosion, will help mitigate what loomed as a critical supply situation for the oxidizer used in solid-fueled rockets.** **Page 5**

■ **Human Genome Project got a lift from new findings reported at an international conference that appear to reinforce the belief among most researchers that the genome should be studied in its entirety rather than piecemeal.** **Page 5**

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High-strength fiber is basis for a number of innovative protective clothing products. **Page 23**

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Cover: Photo courtesy of Du Pont

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Chemical & Engineering News
1155—16th St., N.W., Washington, D.C. 20036

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Published by
AMERICAN CHEMICAL SOCIETY
(202) 872-4600; TDD (202) 872-8733
John K Crum, Executive Director
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PUBLISHING BOARD: Jeanne M. Shreeve (*Chairman*); *Board of Directors Chairman:* Ernest L. Eliel; *President:* Clayton F. Callis; William P. Jencks; Gary J. Long; John H. Nelson; and Louis D. Quin

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Subscription Rates 1989. Printed editions: nonmembers U.S. 1 yr. $55, 2 yr. $99, outside U.S. 1 yr. $86, 2 yr. $161. Air freight rates available on request. Rates above do not apply to nonmember subscribers in Japan, who must enter subscription orders with Maruzen Co. Ltd., 3-10 Nihonbashi 2-chome, Chuo-ku, Tokyo 103, Japan. Tel: (03) 272-7211. Single copies: Current $8.00. Rates for back issues and volumes are available from Microforms & Back Issues Office, ACS, 1155—16th St., N.W., Washington, D.C. 20036. Back and current issues available on microfilm and microfiche. Rates on request from Microform Program, ACS.

Chemical & Engineering News (ISSN 0009-2347) is published weekly except for the last week in December by the American Chemical Society at 1155—16th St., N.W., Washington, D.C. 20036. Second-class postage paid at Washington, D.C., and additional mailing offices. POSTMASTER: Send address changes to Chemical & Engineering News, Membership & Subscription Services, P.O. Box 3337, Columbus, Ohio 43210. ACS assumes no responsibility for the statements and opinions advanced by the contributors to its publications.

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LETTERS

CHEMICAL SAFETY

Liquid sulfur trioxide

SIR: The steadily increasing use of sulfur trioxide for commercial sulfonation prompts a caveat on its use in organic solvents. It is most often used as a vapor (boiling point 45 °C), but it is sometimes applied more conveniently as a solution in a chlorinated organic solvent. It is miscible in all proportions with many of these, with dichloromethane and 1,2-dichloroethane being favored for current commercial use because of cost and favorable physical properties.

These, and all other of the numerous chlorinated solvents tested to date, can react with SO_3 with varying degrees of ease—in some cases with explosive violence, and in most cases with the formation of toxic or irritating gases such as phosgene, which results from reaction with carbon tetrachloride. [These reactions are discussed in more detail in Gilbert, E. E., "Sulfonation and Related Reactions," Krieger Publishing Co., Melbourne, Fla., pages 4 and 371 (1977)].

It is therefore suggested that the following precautions be considered when using solutions of SO_3 in chlorinated solvents: (1) Maintain at room temperature or below; (2) Don't store—make only enough for immediate use; (3) Use unstabilized SO_3, since stabilizers promote reaction between the solvent and SO_3; (4) Avoid concentrated solutions (i.e., above about 25%); (5) Use fluorochloro solvents—they are more stable; (6) Add SO_3 and the organic compound concurrently to the solvent; (7) Use "fail-safe" equipment; (8) Consider the alternative use of liquid SO_2 (boiling point −10 °C)—an excellent, inexpensive solvent.

Everett E. Gilbert
Morristown, N.J.

Editor's note: Dichloromethane (methylene chloride) is considered by the American Conference of Governmental Industrial Hygienists to be a suspected human carcinogen. The need for proper ventilation and/or respiratory protection in working with liquid SO_3 and SO_2 should be noted.

Waste reduction

SIR: Mark Dorfman's letter (C&EN, Sept. 4, page 3) upholds the reduction of waste. Who could disagree with such obvious virtue?

Unfortunately, his statements are highly inaccurate. Most companies (including ours) are delighted with an annual payback of 50 cents for every dollar invested. If a return of "$50 for every dollar invested" (as he claims) were available, we'd be trampled in the rush to invest. We would not need a government edict.

Perhaps an act of Congress is needed, because much waste recycling is prevented by government action.

Two examples come to mind immediately. First, factories are generally not allowed to burn alcohols as industrial boiler fuel; the same alcohols are acclaimed as the solution to air pollution problems. The regulations also forbid one to burn as boiler fuel the same hydrocarbons that are burned as automobile fuel.

These are deemed "nonstandard fuels" by current Environmental Protection Agency regulations. It is indeed legal to burn them, but only after investment in instrumentation and supervision which return 2 cents for each dollar committed.

Second, regulations severely limit the reuse of solvents by routine distillation. If a solvent is part of a process loop, it may be recovered and reused. If the same material is taken out of the loop and put into drums for later distillation and reuse, it can be deemed hazardous waste and therefore cannot be reused.

Meanwhile, more and more bills are proposed telling us to reduce waste. Will the right hand in EPA tell the left hand?

Seymour Mann
President, Aceto Corp.
Flushing, N.Y.

Change over stagnation

SIR: I thought C. Milliren's comments about the decline in U.S. patents were exceptional (C&EN, Aug. 28, page 2). I also think we are missing the boat on turning ideas into patents and then into products because so much of corporate effort is now being focused on the short term and not on the long term. Corporate attitude is primarily responsible for the kind or lack of research that is carried out. All eyes turn to the chief executive officer and his or her vision. The worker, after hearing the goals set forth, understands and then follows the directives. The visionary attitude can be conveyed as, "Ideas are a dime a dozen," or

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ordinator for Shell and director of Shell International Chemicals Co., is the sheer volume of R&D investment by Western European companies over the past five years. R&D spending of major chemical companies in Western Europe has risen to greater levels than in the U.S. or Japan, from below $3 billion in 1983 to nearly $6 billion last year.

Part of the R&D work in the future, conference attendees agreed, will have to be on environmental matters, which also was the theme of this year's EPCA conference. Herwig Hulpke, director of the environmental department at Bayer, pointed out that when a recent survey of young people aged 16 to 20 asked about political priorities to the year 2000, some 88% mentioned the environment first. "Things have changed drastically and very rapidly over the past few years," he said. "This is a very big issue in public opinion."

The conference allocated one morning's session to a debate between representatives of chemical producers from West Germany and the U.S., and environmentalists from the U.K. and Sweden. The debate was introduced by Tom Burke, chairman of Green Alliance, based in London.

He posed the question: "How does the chemical industry look to the outside world?" And he furnished the answer. "You didn't set out to become monolithic, secretive, indifferent, sometimes arrogant, always selfish, avoiding responsibilities, cosmeticizing problems, and reluctant to act. But you got there anyway. You live in a world of prejudice, and only confirming evidence counts. You can't blame environmentalists for these perceptions—you did it all yourselves," he added, citing a string of serious industrial accidents or tragedies.

In some areas, he pointed out, those perceptions are beginning to matter. For example, industry is finding it more difficult to acquire sites, there are higher regulatory hurdles, and there is difficulty in recruiting the best and brightest young people.

Among other things, Burke presented a short list of industrial do's and don't's. First, "Improve your environmental performance. That's the bottom line: Nothing will improve without that. You must treat the environment like any other capital asset," he said, requiring such attention to detail as personnel training, performance monitoring and audits, specified resources given to specific programs, and so on.

"Be open. Answer the questions before they're asked—it's not hard to anticipate what people are concerned about. Be seen to be trying. Let people know you are trying harder," he suggested. And just as important, "Don't fight battles you've lost. Get ahead of the wave."

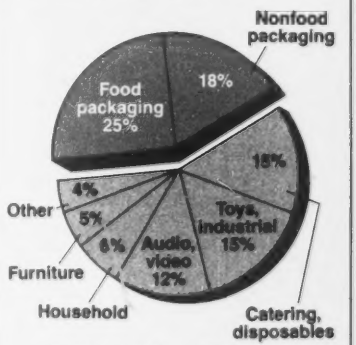
What not to do? "Do not expect quick results," he advised. "You didn't get where you are now overnight. And do not use the words 'emotional,' 'irrational,' or 'expensive'—they won't work."

Patricia Layman

Rising polystyrene use spurs Atochem moves

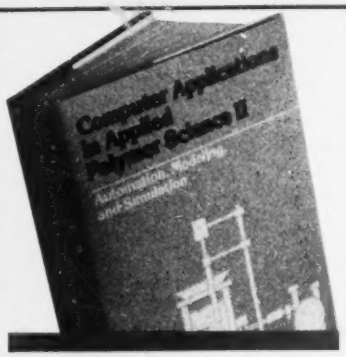
Atochem, the chemicals arm of the French Elf Aquitaine energy group, is boosting its polystyrene capacity more than 10% to 660 million lb per year. Its latest expansion is at the Stalybridge plant of Atochem U.K. Ltd., near Manchester, which late last month opened its third polystyrene line with a capacity of 120 million lb per year. The new line will replace an older, technically more

Packaging accounts for 43% of polystyrene use



Total 1988 West European consumption = 3.64 billion lb

Source: Atochem



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limited plant of 55 million lb capacity, giving a net increase of 65 million lb per year, and raising the total polymerization capacity at Stalybridge to 176 million lb per year.

Atochem is making the addition as part of a modernization program that will affect its entire polystyrene capacity. The company got a major boost in 1987, when it acquired the polystryene operations of Arco Chemical at El Prat de Llobregat, near Barcelona, with a capacity of 132 million lb per year. Last year, it modernized its Gonfreville unit, near Le Havre, France, where it now has a capacity of 352 million lb per year.

Moreover, also this year and into next, the company will be boosting styrene capacity at Gonfreville, completing a new pilot plant at El Prat, and modernizing two compounding plants at El Prat and Stalybridge. Current compounding capacity is 77 million lb per year.

For Atochem, the polystyrene business is a good one. Current consumption of the polymer in Western Europe is about 3.64 billion lb, up from 2.87 billion lb in 1984, with much of the growth coming from a spurt in demand in the past two years. One of the major contributions to this spurt has been the growth in the new segment of packaging for compact discs, in the audio/video category, which accounted for only about 5%, or 138 million lb, of the polystyrene market in 1978. The category now accounts for 12% of consumption, or 437 million lb.

This year, "if the rate of increase of the first half of 1989 is maintained, it would be feasible to expect the ... growth rate to be 2 to 3%," said Alain Perret, director of the polystyrene business for Atochem, at the plant opening ceremonies.

However, he added, future growth will be more conservative. He predicted that demand for polystyrene in Western Europe will grow 1.5 to 2% per year, with exports growing at a faster rate. The rate of increase in demand in developing economies, he added, will be much quicker than in the three major producing areas of North America, Europe, and Japan.

Patricia Layman

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